



Genetic constructs encoding carotenoid biosynthetic enzymes

Description of Technology: This invention is in the field of microbiology. More specifically, this invention pertains to nucleic acid fragments encoding enzymes useful for microbial production of functionalized carotenoid compounds.

Patent Listing:

1. **US Patent No. 7,105,634**, Issued September 12, 2006, "Genetic constructs encoding carotenoid biosynthetic enzymes"

<http://patft.uspto.gov/netacgi/nph-Parser?Sect2=PTO1&Sect2=HITOFF&p=1&u=%2Fnetacgi%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&d=PALL&RefSrch=yes&Query=PN%2F7105634>

Market Potential: Carotenoids represent one of the most widely distributed and structurally diverse classes of natural pigments, producing pigment colors of light yellow to orange to deep red. Eye-catching examples of carotenogenic tissues include carrots, tomatoes, red peppers, and the petals of daffodils and marigolds. Carotenoids are synthesized by all photosynthetic organisms, as well as some bacteria and fungi. These pigments have important functions in photosynthesis, nutrition, and protection against photooxidative damage. For example, animals do not have the ability to synthesize carotenoids but must instead obtain these nutritionally important compounds through their dietary sources.

It is clear that scientific understanding has yet to reveal all of nature's untapped diversity, in order to industrially duplicate the wide spectrum of carotenoids that can be readily produced by nature. In light of these needs, the problem to be solved is to isolate and functionally characterize the nucleic acid sequences of those genes involved in C.sub.30 carotenoid biosynthesis in *Methylobacter* for their use in carotenoid production.

Applicants have solved the stated problem by isolating and functionally characterizing three unique open reading frames encoding the enzymes crtN, ald, and crtN2 from a *Methylobacter* sp. strain 16a. These genes will aid in synthesis of carotenoids beyond what is "known" in nature, to enable industrial synthesis and high levels of production of uniquely functionalized C.sub.30 C.sub.80 carotenoid compounds.

Benefits:

- Isolates and characterizes genes relative to carotenoids

Applications:

- Microbiology
- Food additives

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